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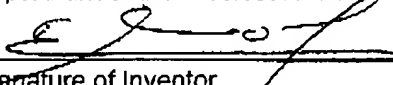
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Inventor(s): Enrique Musoll, Stephen Melvin, Mario Nemirovsky

Title of Invention: Mechanism for allowing a limited packet head and/or tail growth without moving the packet to a different memory location

Enclosed is a disclosure of the above-titled invention consisting of 5 sheets of description and (1 included) sheets of drawings. A check or money order in the amount of 10.00 is enclosed to cover the fee (37 CFR 1.21(c)).

The undersigned, being a named inventor of the disclosed invention, requests that the enclosed papers be accepted under the Disclosure Document Program, and that they be preserved for a period of two years.


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Please take the time to fill it out properly as the provision of clear and concise disclosure will speed the process of preparing and filing your case. In addition a signed disclosure document filed with the patent office can effectively remove references anticipating our invention in the prosecution of the case thereby enhancing our chances of obtaining patents. In most cases, verbal disclosure or short e-mail messages are inadequate forms of disclosure and should be avoided.

To fill out the form correctly, follow each set of instructions provided with each heading.

Title of Invention

This section is simply a brief descriptive title of the invention.

Insert title here: Mechanism for allowing a limited packet head and/or tail growth without moving the packet to a different memory location.

Inventors

We will need the residence address, mailing address, full legal names and citizenship of each inventor at the time of submission of the disclosure.

Enrique Musoll

Stephen Melvin

Mario Nemirovsky

Related inventions known or authored by you or your company

This section should list any prior patents known to you or patents that you have already filed if the present invention depends on them for successful practice.

[1] PA3814

[2] PA3818

Background

This section is used to describe “the state of the art” before being improved or enhanced with your invention. It should include a brief summarization of existing technologies if any that the present invention improves upon or replaces, a description of any specific problems with “the way the art is practiced now”, and a very brief statement of what is needed to improve or replace the existing art. Include references by U.S. patent number any closely related patents discovered during any prior-art searches

Begin Background here:

In [1] a mechanism is disclosed that, upon a packet arrival, its packet data is stored into a memory. This mechanism, named in [1] as Background Memory Management, is implemented in XCaliber by the Paging Memory Manager block, or PMMU, described in [2].

No claims in [1] or [2] cover a feature in the PMMU that allows a certain amount of “in-site” packet header or tail growth. In other words, if packet A is stored right after packet

B, and either the tail of packet A needs or the head of packet B needs to grow, one of the two packets needs to be moved to a different location in memory.

To prevent this, the PMMU has a mechanism (disclosed here) that allows a limited head and tail growths so that no move of the packet is required.

Description of Invention

This section should explain the basic apparatus and method of practicing your invention according to a preferred state. If certain **apparatus** of the invention is not known in the prior art then indicate so. If a **method** of the present invention is not known in prior art then indicate so. If certain methods and apparatus are known in prior art then they do not have to be greatly detailed. However any new subject matter novel over the prior art should be fully explained and represented by drawings and/or sketches.

Begin description here:

The size of a packet can grow, shrink, or remain the same due to the processing of the packet. If the size varies, usually the added or removed data will belong to either the header of the packet or the tail of the packet.

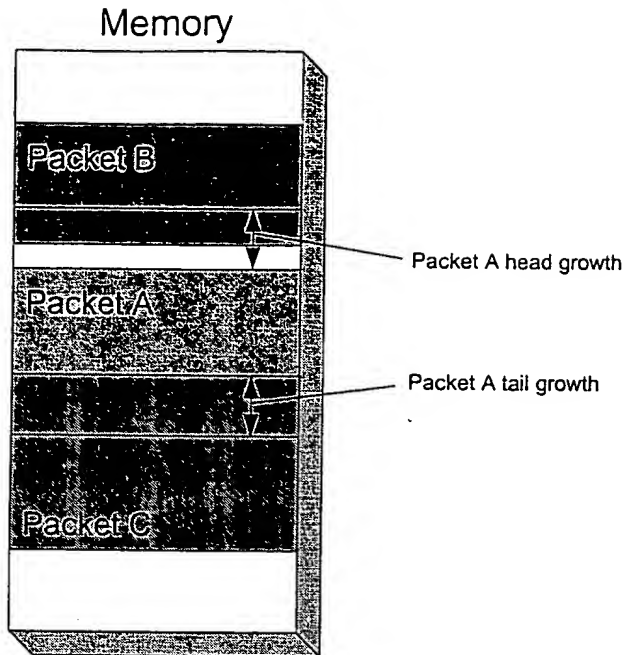


Figure 1: Head/tail growth can overwrite other packets.

If the packet resides in memory, a problem may exist because the added packet data can overwrite the data of another packet. As shown in Figure 1, if the head of packet A grows, the new data may overwrite the data of packet B; similarly, if the tail of packet A grows, packet C might be overwritten.

The PMMU block in the PMU unit of XCaliber is responsible to decide where the incoming packets will be stored in a memory [1][2]. The PMMU block logically divides the memory into fixed-size chunks, and assigns as many chunks as needed to the incoming packets. This fixed size value is not visible to software. Therefore, when software process the packet and the head or the tail needs to grow, software does not easily know whether the additional data will overwrite valid data from another packet residing in the memory. Thus, software will have to move the packet to a different portion in memory that has enough space for the original data plus the added data.

The moving of a packet from one location to another is costly in time and resources, especially for larger packets. Thus, a mechanism is welcome to solve this problem. The mechanism implemented in XCaliber (and disclosed here) allows a limited amount of

space that a packet can safely use to grow its header or tail or both without overwriting any neighboring packet.

The PMMU can be configured so that, when a packet arrives of size S , the contents of two configuration registers (named here as H and T) are added to S (resulting in a total size of $P = S + H + T$) in order to determine the total size that the packet might occupy. Thus, the PMMU block will search for a chunk of P bytes instead of S bytes. Let us assume that a chunk of P bytes is found and its base address is A . Then, the PMMU will start storing the packet starting at address $A+H$. Therefore, the packet will be surrounded by a buffer zone of size H at the head and a buffer zone of size T at the tail.

H and T are visible to software. This implies that:

- Software can configure the amount of buffer space to be left at the head and tail of the incoming packet.*
- Software is aware of the maximum number of bytes that the head and the tail can grow. If more space is needed, software needs to explicitly move the packet to a different location.*

Please have all inventors sign the disclosure and mail a hard copy to CCPA for participation in the document disclosure program. Also e-mail to Mark Boys markboys@centralcoastpatent.com and CC Don Boys rexboys@centralcoastpatent.com. Your cooperation in the filling and return of this form will expedite the processing of your application and increase our chances of obtaining a patent for your invention.

Mark Boys, CCPA